of aniline is large. Thus peroxide of manganese or bichromate of potash may be used in the same way as the red prussiate of potash in the last experiment; but these tests will not answer with less than the $\frac{1}{500}$th of a grain of aniline. Lastly, a drop of a solution of chloride of lime may be added to the acid liquid, and if the quantity of aniline exceeds the $\frac{1}{100}$th part of a grain it will cause a purple reaction.

9th. If the quantity of saline residue from the last operation is large, and there is reason to believe that much ammonia is present, this alkali must be got rid of, for it greatly interferes with the success of the colour-experiments. The residue, therefore, is made moist with water, and rubbed down with about twice its bulk of neutral carbonate of soda. It is then exposed to the air for a short time until the odour of ammonia has passed away. It is then treated with strong alcohol, filtered, acidulated with dilute sulphuric acid, and again evaporated. The aniline is now fit for the colour-experiments.

There are no fallacies to these experiments; for although, as I have elsewhere shown, strychnia will give nearly the same colour-reactions, yet in the first place this alkali is not volatile like aniline, and will not therefore distil over as the latter does; and in the next place, while the best effects, in respect of colour, are developed with dilute acid and aniline, strychnia requires the concentrated acid. These differences are sufficient to prevent any embarrassment as regards the two alkaloids.

II. "On the Immunity enjoyed by the Stomach from being digested by its own Secretion during Life." By FREDERICK W. PAVY, M.D. Communicated by Dr. SHARPEY, Sec. R.S. Received April 29, 1863.

(Abstract.)

The author stated that the opposition which his view on the above subject received the evening of its announcement, in his former communication read January 8, 1863, had induced him to perform a series of additional experiments. As from these experiments some important confirmatory evidence was supplied, he deemed it desirable to present a further communication to the Society on the subject.

He had again denuded the stomach of a patch of mucous membrane, and in one experiment had allowed the animal to live for ten days. It had fed in an ordinary manner every day, and when killed, reparation was found in an advanced stage towards completion, the walls opposite the denuded part having been considerably thickened by new matter that had been thrown out.

Upon much further extended observation the author found that the standard he had taken from the rabbit, as regarded the *post-mortem* action of the contents of the stomach upon the organ itself, was not just in its application to the dog. Actual experiment on the dog had shown that upon the animal being killed at a period of full digestion, and its temperature being afterwards maintained about the degree belonging to life, the effect at the end of five and six hours only amounted to more or less digestion of the mucous membrane. In the rabbit, under similar circumstances, the effect had gone on to perforation, on account, apparently, of the stronger acidity of the gastric contents. In reality, then, the effect of arresting the circulation through the stomach during life, about coincided in both rabbit and dog with what occurred, other circumstances being equal, after death.

As a counterpart to the experiments originally mentioned, where dilute non-corrosive acids had been introduced into the stomach of the dog, and the flow of blood through the organ afterwards arrested, an operation that was followed by comparatively rapid perforation, the author had used the same acids, in the same quantities, and similarly diluted, but the circulation was allowed to remain free, and now the stomach resisted digestive attack. Ligatures had of course been applied to secure the retention of the acid liquid introduced.

A mode of experimenting suggested by Dr. Sharpey had been undertaken. After an incision through the anterior wall of the stomach, a portion of the posterior wall had been drawn forward, and a ligature placed tightly around it, so as thus to arrest the circulation through a limited portion of the organ's parietes. It was found that this constricted mass underwent digestion like a morsel of food.

An experiment had been performed bearing on the explanation that had been given to account for the attack upon the living frog's legs and rabbit's ear by digestion whilst the stomach remained protected. Three drachms of muriatic acid, diluted to three ounces with water, were introduced into the stomach of a dog, and the end of the œsophagus and the pylorus ligatured, without including the vessels, so that the circulation through the organ was left free. In one hour and forty minutes death took place, and on the parts being examined immediately, perforation, with extensive digestion of the interior of the stomach throughout, was found. The author considered that the question of result was clearly shown to resolve itself into one dependent on degree of power possessed by the acid contents of the stomach on the one hand, as against the alkaline circulation on the other. With a certain amount of acid only in the stomach, the circulation can afford the required protection; whilst with a larger amount the influence of the acid prevails, and digestive solution of the organ is the result. Allow, now, the contents of the stomach to remain the same, and vary the degree of vascularity in the parts submitted to the digestive influence. We have simply here a converse arrangement of the circumstances; and the position is represented by the situation of the stomach as compared with that of the frog's legs and rabbit's ear.

III. "On a Question of Compound Arrangement." By J. J. Sylvester, M.A., F.R.S., Professor of Mathematics in the Royal Military Academy, Woolwich. Received April 27, 1863.

My successful but as yet unpublished researches into the Theory of Double Determinants have involved the consideration of the following curious case of arrangements.

There are given $m+n-1$ counters of n distinct *colours* just capable of being packed into m *urns*. The question refers to the distribution of the counters among the urns, subject to the condition that it shall *not* be possible to form a closed circuit of double colours between any number of the urns chosen arbitrarily, *ex. gr.* we must allow no distribution of counters in which one urn contains blue and yellow, a second yellow and red, a third red and green, and a fourth green and blue, because here *blue, yellow, red,* and *green* would form a closed circuit. This condition, it is evident, excludes the same combination of colours from existing in any two of the urns, and also the repetition of any one colour in the same urn. Any distribution of counters obeying this condition may be called an excyclic distribution.